

## STUDY OF THE CONVERSION CRITERIA FROM LAPAROSCOPIC CHOLECYSTECTOMY TO OPEN SURGERY

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### ABSTRACT

Laparoscopic cholecystectomy is the best treatment for benign gallbladder diseases, but in certain circumstances the surgeon must switch to open surgery to ensure that the operation can be completed safely. This study aims to evaluate the reasons for switching from laparoscopic surgery to open surgery in the modern era.

### INTRODUCTION

Laparoscopic cholecystectomy is the treatment of choice for benign gallbladder diseases. But in cases where laparoscopic cholecystectomy is risky, the surgeon may have to switch from laparoscopic to open surgery. Data from the medical literature shows that 2-15% of laparoscopic cholecystectomy operations are converted to open surgery during surgery for various reasons. The aim of this study is to identify the risk factors for converting laparoscopic cholecystectomy to open surgery, a retrospective analysis of medical records and operating protocols was performed to find out all laparoscopic cholecystectomy performed at one center over a four-year period. The study group consisted of 19 patients who were referred to open surgery during laparoscopic surgery. Conversion risk factors were evaluated using logistic regression analysis that modeled the probability of a given event as a function of independent factors. Statistically significant factors in the regression model with all explanatory variables: age, gender, emergency surgery, acute cholecystitis, adhesions, chronic cholecystitis, anatomical difficulties. The use of predictive risk factor assessments or graphs can be the most useful tool in risk classification. With these predictive tools, clinicians can improve care based on known risk factors for conversion, and patients can be better informed about the risks of surgery.

**Aim of study:** To study the incidence and risk factors that led to the conversion from laparoscopic surgery to open surgery in cholecystectomy.

**Patients and Study Methods:** During a period of four years from 26/6/2016 to 30/12/2020, 910 patients

underwent laparoscopic cholecystectomy at Tishreen University Hospital in Lattakia, and 891 patients completed the laparoscopic method, 19 patients required a transfer to open surgery. A review of the medical records of all these patients was conducted.

Demographic characteristics, comorbidities, body mass index, presence of diabetes mellitus, duration of symptoms in acute cases, findings during surgery, laboratory and radiological studies were evaluated before surgery.

Histopathological findings were compared with preoperative diagnosis.

The medical literature records were reviewed by the baseline curve using the keywords "transformation in laparoscopic cholecystectomy" to identify published studies of interest. Identified studies were selected on the basis of relevance to our topic, data availability.

### Surgical Procedure

Pneumoperitoneum is performed using a Veress needle at an intra-abdominal pressure  $\leq 14$  mmHg.

Four trocars, two 5 mm and two 10 mm trocars, were carefully inserted into the abdominal cavity.

The pressure of the peritoneal pneumoperitoneum was maintained in the range of 10 to 13 mmHg during the procedure. A standard set of cholecystectomy tools was used during the procedure.

The Veress needle technique is the most commonly used, classical, and time-tested method. However, it is associated with very slow insufflation rates (depending on the brand of equipment) and potentially life-threatening complications. Many studies evaluating the advantages and disadvantages of closed or open methods for creation of pneumoperitoneum have been conducted. However, randomized, multicenter clinical studies have not been able to provide a definite answer to which of the two methods is safer.

All patients underwent postoperative drainage of the peritoneal cavity using Redon's method, maintained for 24 h, and with more drainage content for 2 to 3 days.

### Statistical Analyses

**Study Design:** Observational Cross-Sectional Study

#### 1- Descriptive statistics

Quantitative variables with mean and standard deviation.

Qualitative variables in frequencies and percentages.

#### 2- Inferential Statistical Based on Statistics Laws

Calculation of the Incident Rate.

Chi-square test to study the relationship between qualitative variables.

Independent T Student test to study the mean differences between two independent groups.

The variables with statistical value were entered into the multivariate analysis equation to identify the independent factors associated with the transfer to open surgery, and the results are considered statistically significant with a p-value < 5%.

Adoption of the program IBM SPSS statistics (version20) to calculate the statistical transactions and analyze the results.

### RESULTS

The research sample included 910 patients (400 males, 510 females) who were accepted and prepared for laparoscopic cholecystectomy at Tishreen University Hospital in Lattakia during the time period 2016-2020. The investigators included the inclusion criteria in the research.

A detailed clinical story was taken and radiological and laboratory investigations were conducted for all patients, with all samples sent to the histopathology laboratory after the completion of the surgical work.

The patients' ages ranged from 18 to 86 years, and the mean age was Median = 47 years.

**Table (1): Reasons for conversion from laparoscopic cholecystectomy to open surgery from patients admitted to the General Surgery Division of Tishreen University Hospital in Lattakia during the time period 2016-2020.**

Reasons to conversion to open surgery	Number	Percentage
Acute cholecystitis	11	57.9%
adhesions	5	26.3%
Uncontrollable bleeding	1	5.3%
Visceral injury	1	5.3%
CBD injury	1	5.3%

Table(1): From the previous table that the most common reasons for switching from laparoscopic cholecystectomy to open surgery were the presence of acute cholecystitis in 57.9% of that group, followed by the presence of adhesions in 26.3%, the visceral damage was a duodenal

perforation and the uncontrolled bleeding came from parenchymal liver injury.

**Table (2): The comparison between the two groups of open surgery and laparoscopic cholecystectomy in a sample of 910 patients admitted to the General Surgery Division at Tishreen University Hospital in Lattakia during the time period 2016-2020.**

Studied Variables	Study group		P-value
	Laparoscopic cholecystectomy(891)	open cholecystectomy(19)	
<u>Gender</u>			
Male	350(39.3%)	12(63.2%)	0.01
female	541(60.7%)	7(36.8%)	
age	47(18-83)	58(19-86)	0.04
adhesions	105(11.8%)	6(31.6%)	0.009
Acute cholecystitis	137(15.4%)	11(57.9%)	0.0001
Uncontrollable bleeding	0	1(5.3%)	-----
CBD injury	0	1(5.3%)	-----
Visceral injury	0	1(5.3%)	-----

Table(2): We note that there are significant statistically significant differences between the two groups of patients with regard to male sex, adhesions and acute cholecystitis, which were higher in the open surgery group.

the radiographic and echogenic characteristics of patients who referred to open surgery, as the percentage of patients who had acute cholecystitis who referred to open surgery was 7.4% of the total patients with acute cholecystitis.

We note from the previous table the presence of acute cholecystitis in both groups, so it was necessary to study

**Table (3): Laboratory, ultrasound, and surgical findings of acute cholecystitis patients (11 patients) admitted to the General Surgery Division of Tishreen University Hospital in Lattakia who switched to open surgery during the time period 2016-2020.**

Findings	Number	Percentage
Laboratory findings		
Increased WBC>11000	10	90.9%
Increased CRP>70	6	54.5%
Ultrasound findings		
Gallbladder wall thickness>1cm	7	63.6%
Intraoperative		
Anatomical difficulties	7	63.6%
Technical difficulties	5	45.5%
Severe adhesions with the duodenum and colon	5	54.5%

Table (4) results of the multiple analysis of the reasons for switching from laparoscopic cholecystectomy to open surgery among patients admitted to the General Surgery

department at Tishreen University Hospital in Lattakia during the time period 2016-2020.

**Table (4): After entering the variables with a statistical value into the logistic regression equation, we found that the presence of acute cholecystitis increases the risk of conversion from laparoscopic cholecystectomy to open surgery by 4.6 times, the presence of adhesions by 3.1 times, and the male sex increases the risk of conversion from laparoscopic to open surgery by 2.3 times.**

Independent factors	ORa	CI	P-value
Acute cholecystitis	4.6	[1.9-9.8]	0.0001
adhesions	3.1	[1.2-7.2]	0.003
Male gender	2.3	[0.3-5.7]	0.01

## DISCUSSION

During the four-year study period, the Department of General Surgery at Tishreen University Hospital in Lattakia performed 912 cholecystectomy operations. It required conversion from laparoscopic to open surgery in 19 patients, with a rate of 2.1%. This percentage is consistent with what was previously published in international studies, where the study was conducted in a teaching university hospital. However, despite the development of laparoscopic techniques in the world, there is no indication of a steady declining decrease in the conversion rates from laparoscopic to open surgery. As shown earlier in our study, it was found that the most common causes of conversion from laparoscopic surgery to open surgery were acute cholecystitis, male sex, and adhesions, where acute cholecystitis accounted for 57.9% of conversion cases. The reason for this is due to the presence of severe adhesions, and an important thickening of the gallbladder wall And the difficulty of recognizing the anatomical landmarks in the Calot triangle. Male sex was an important risk factor for referral to open surgery, as the percentage of males

reached 63.2% of patients who were referred for open surgery. This may be due to the delay in males requesting medical advice and their lack of interest in health compared to females, which leads to an increase in the severity of inflammation and adhesions.

Referral to open surgery was required in 26.3% of patients because of the adhesions. The adhesions were caused by either a previous laparotomy or severe inflammation in the Calot's triangle or in the gallbladder itself. Our review of the medical literature included a sample of published studies covering the time period during which laparoscopic surgery entered the modern era, where the reasons for switching from laparoscopic to open surgery remained somewhat unchanged.

## CONCLSION

Switching to open surgery is not a sign of failure but should be considered as a safe alternative in complex cases.

In conclusion, acute cholecystitis, male gender, and adhesions are important risk factors, and when present, the possibility of needing to switch to open surgery should be considered.

When risk factors increase, the patient must be informed in advance of the possibility of switching to open surgery during the operation.

When several risk factors are combined, it is recommended to start the laparoscopic method, but to switch early to open surgery if significant progress is not made. Making the decision to transfer early will save time and reduce costs. The willingness and ability of surgeons to convert to open cholecystectomy continues to be important to the safety of this operation.

A Meta-Analysis Teng Fei Yang, Lin Guo, Qiang Wang.

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